

ART. XXV.—*A Manual of Inorganic Chemistry, arranged to Facilitate the Experimental Demonstration of the Facts and Principles of the Science.* By CHARLES W. ELLIOT, and FRANK H. STORER, Professors of Chemistry in the Massachusetts Institute of Technology. Second edition. pp. 605, Appendix, &c., lix. New York: Ivison, Phinney, Blakeman & Co., 1868.

THIS manual claims only to embody in a new form the existing knowledge of the facts and principles of chemical science without adding anything novel to either. The method of presenting the subjects to the learner's mind is by a combination of analytical and synthetical processes proceeding step by step, from the familiar to least known facts, introducing in their appropriate places the technical terms and principles of the science, or those deductions which chemists have drawn from the facts as they have been developed.

The consideration of the air and its largest constituent, nitrogen, first claims attention, then succeeds water, its separation into its constituents hydrogen and oxygen and the properties of these gases, under which heads are explained the nature of atoms and molecules, of oxidation, and combustion, the processes of diffusion of gases, solution and distillation. Having thus shown the material facts in relation to these elements, their compounds of an inorganic character are brought under view, the combinations of nitrogen with oxygen and with hydrogen affording ample means of explaining clearly the ratios in which they unite, the modes adopted to denote these relations by means of empirical and rational formulæ, carefully insisting that the former expresses facts, the latter opinions which can be adopted only when consonant with *all* the reactions and relations which have been observed, while at the same time they facilitate the acquisition of the science by presenting in a brief, clear, and precise form, both the known and the probable nature of the changes which take place in simple as well as complicated reactions.

Proceeding on the same plan, muriatic acid is considered before noticing its constituents, and its properties, compositions, and analysis discussed. Chlorine being now set free, its properties and union with the previously described elements become proper subjects for investigation, with the analogous bodies bromine, iodine, and fluorine. Ozóne and antozone are noticed in much detail on account of the subject being one of primary importance in the present, and of probable increased value both practical and theoretical for the future.

Thereafter the elements are grouped according to their natural relations, by which much repetition is avoided and the student familiarized with the close similarity in nature and reactions which is found to exist among many bodies. Sulphur a familiar substance becomes the type of a group including selenium and tellurium, with perhaps oxygen—capable of assuming two distinct crystalline forms, opens the way to the discussion of the systems of crystallography, and processes by which crystals may be produced, and its range of combination to that of the nomenclature adopted for the different compounds which it and the other elements form with each other and with metals. Combination by volume and condensation ratios occupy a distinct chapter under this head.

The nitrogen group, containing phosphorus, arsenic, antimony, and bismuth, next attract attention; isomerism and allotropism are clearly defined, and liquid diffusion as differently exhibited by colloids and crystalloids, proven experimentally by means of the dialyzer, with the cautions necessary to insure success. If there be any defect in the system of teaching here adopted, it presents itself under the head of the detection of arsenious acid, where the ammonio-salts of copper and silver could not be noticed without introducing subjects not yet considered, neither do they subsequently appear under their special heads in this relation.

The carbon group in its type, as the element par excellence of organic compounds, opens the way to prominent subjects of chemical philosophy as developed by the compounds of carbon with hydrogen. These, so numerous as when united with oxygen and other elements to count by thousands, have by their complexity given rise to many theories as to their internal organization, which, however much they may differ from each other, all tend to show the great

advantage which is to be obtained in the study of complicated compounds by the power of arranging them in groups or series according to their analogy in nature or composition. Carbon, hydrogen, and oxygen being the elements which are principally engaged in the phenomena of combustion, the acquaintance with their properties and that of the compounds formed by their union renders possible the clear consideration of the effects produced by their union as exhibited in the evolution of light and heat. The nature of ignition and flame, lamps, blow-pipes, &c., the indestructible character of matter and economy of fuel are commented on and explained.

The metals, although more numerous, do not occupy in their consideration the same amount of space. The alkali group, which is made to include thallium and silver, introduces spectrum analysis, glass, gunpowder, photography, &c., concluding with atomicity or the *atom-fixing* power of chemical elements, as exhibited by the power of holding in chemical combination one, two, three, or four atoms of hydrogen. The calcium group follows with remarks on the hardness of waters, and their liability to be contaminated by lead, the last metal in the group. The magnesium group, under zinc, give rise to remarks on the galvanic current and the correlation of forces, and the aluminium group to further remarks on nomenclature.

The remaining metals are associated on the same plan, occupying three chapters, a fourth being devoted to the consideration of atomic weights, and symbols, classification, atomic heat, &c. The appendix takes up the subject of chemical manipulation, weights, and measures, &c.

Written in a clear and comprehensive style, and accompanied by well chosen experiments lucidly described, this work is well calculated for the instruction of the beginner, by alluring onward and gradually bringing to his notice the intricacies of the science instead of repelling by unaccustomed words and ideas which the new student finds hard to seize and appropriate.

In typography and execution the book is worthy of commendation and the size convenient for constant use.

R. B.

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ART. XXVI.—*Diseases of the Heart: their Diagnosis and Treatment.* By DAVID WOOSTER, M. D. 12mo. pp. 209. San Francisco: H. C. Bancroft & Co., 1867.

THE author of this little work tells us in his preface that it is not "a strictly systematic treatise," and deprecates a too rigid scrutiny by saying that it "has been prepared during the intervals of daily toil." His object has been to present to the profession a book in which the rules for the diagnosis and treatment of diseases of the heart and aorta shall be clearly laid down. For the most part, we think, Dr. Wooster has attained his object; certainly so far as the limits of his book will admit of, the seat and character of the different murmurs originating in the heart or in the aorta are correctly given. We think, however, that the assertion which he makes, that "there is no known pathognomonic sign or signs of aortic constriction," is one which few practical auscultators will be disposed to admit; it is true that aortic, like mitral constriction, may exist without a murmur, and that a systolic murmur, heard best at the base of the heart, is often independent of organic disease of this orifice; yet we believe that care will generally enable us to recognize an aortic constrictive murmur when it does exist, as no other murmur is so well propagated in the course of the aorta and large arteries.

The best authorities on the diseases of the heart have evidently been freely consulted by our author, and in his preface he candidly acknowledges his indebtedness to them. In one instance, however, he has misquoted Walshe; he says: "yet neither Walshe nor Hope ever observed the thrill (purring tremour) in any valvular disease." Walshe states distinctly that this thrill may be due either to mitral regurgitant or to aortic constrictive disease (Amer. ed., p. 43,